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(58) Field of Search
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INT CL⁷ **H04M 1/26 1/27 1/56**
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(54) Abstract Title
Producing colour illumination to uniquely identify calling sources

(57) In a communication device, source identifying information (eg telephone numbers) is stored in a memory 13 for respectively identifying calling sources, and colour information corresponding to the source identifying information is also stored in the memory. When a call is received, the memory is searched for source identifying information identifying the source of the received call. If such identifying information is detected, a lighting arrangement 10 is energized according to the colour information stored in the memory corresponding to detected source identifying information.

FIG. 2

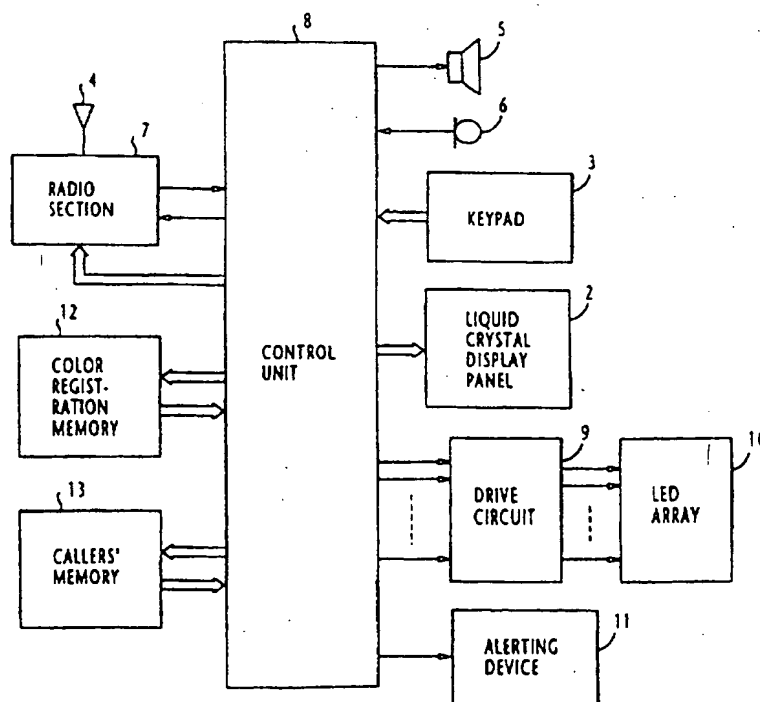


FIG. 1

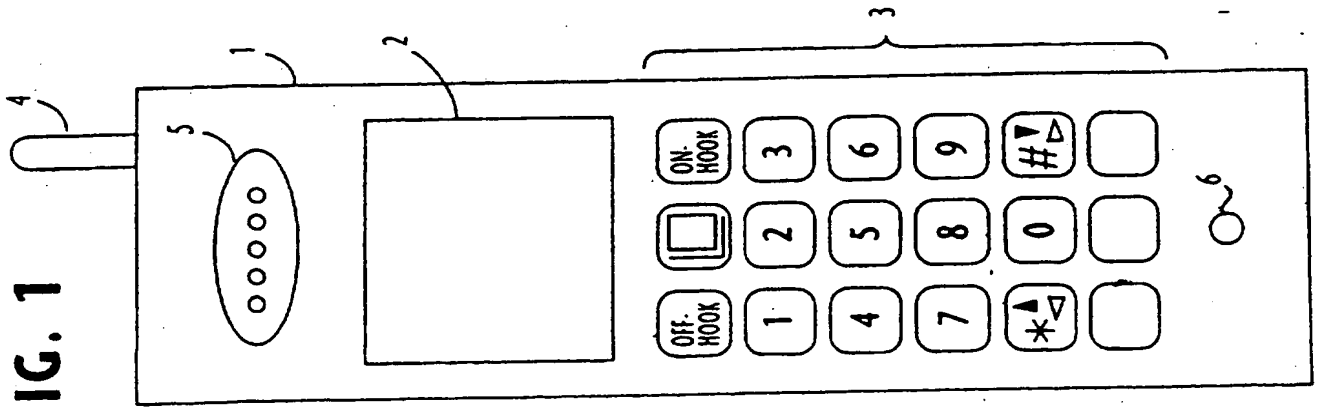


FIG. 2

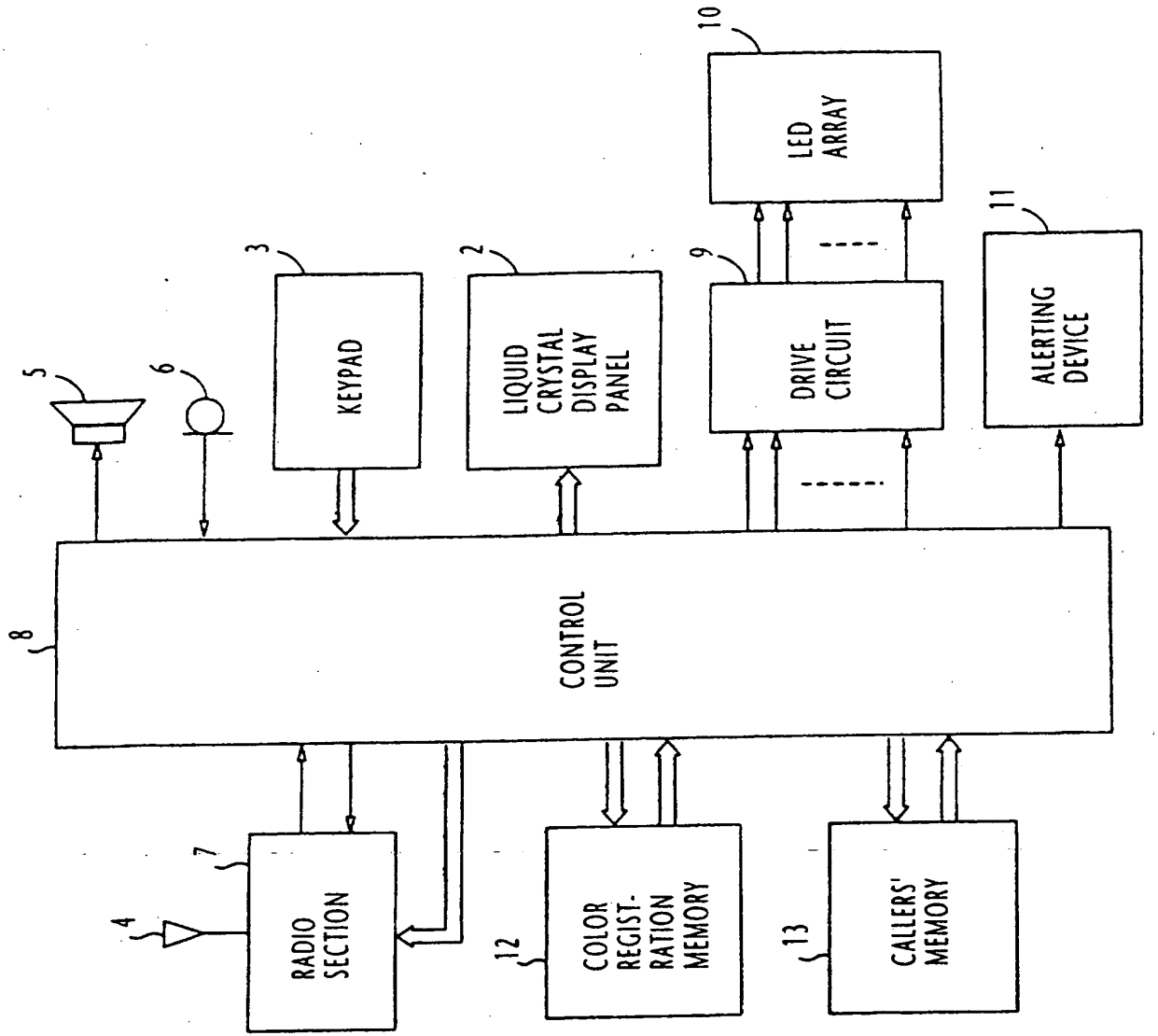


FIG. 3A

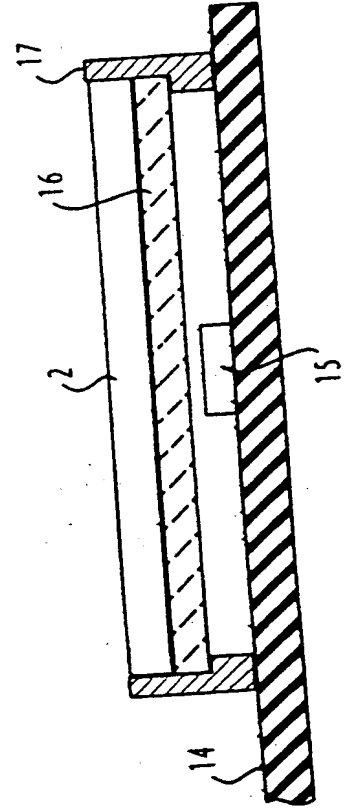
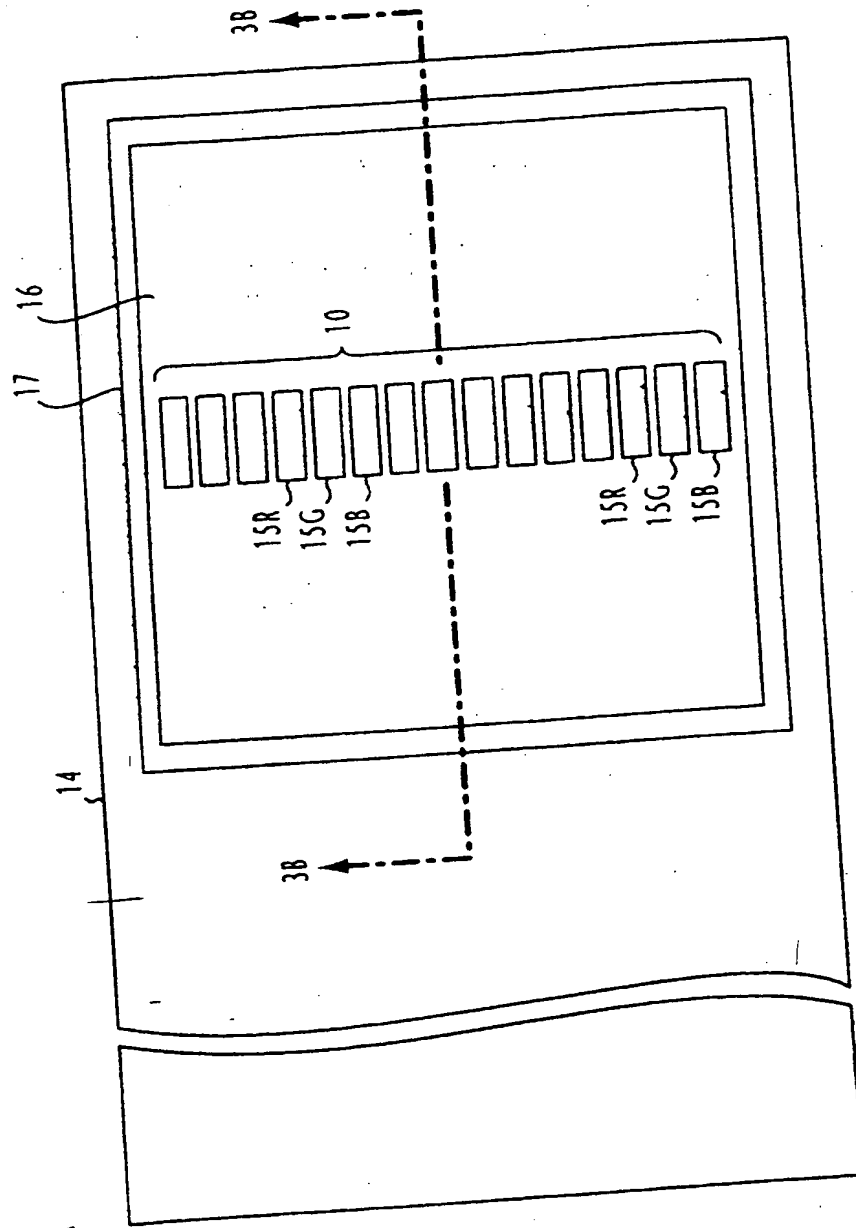


FIG. 3B

FIG. 4COLOR REGISTRATION MEMORY

²¹ INDEX (i)	²² RED	²³ GREEN	²⁴ BLUE
1	3	0	0
2	2	0	2
⋮	⋮	⋮	⋮

FIG. 5COLOR ASSIGNMENT MEMORY

PHONE NUMBER	RED	GREEN	BLUE
09012345678	3	0	3
0312345678	3	0	0
09087564321	1	0	2
0322224444	1	3	3
⋮	⋮	⋮	⋮

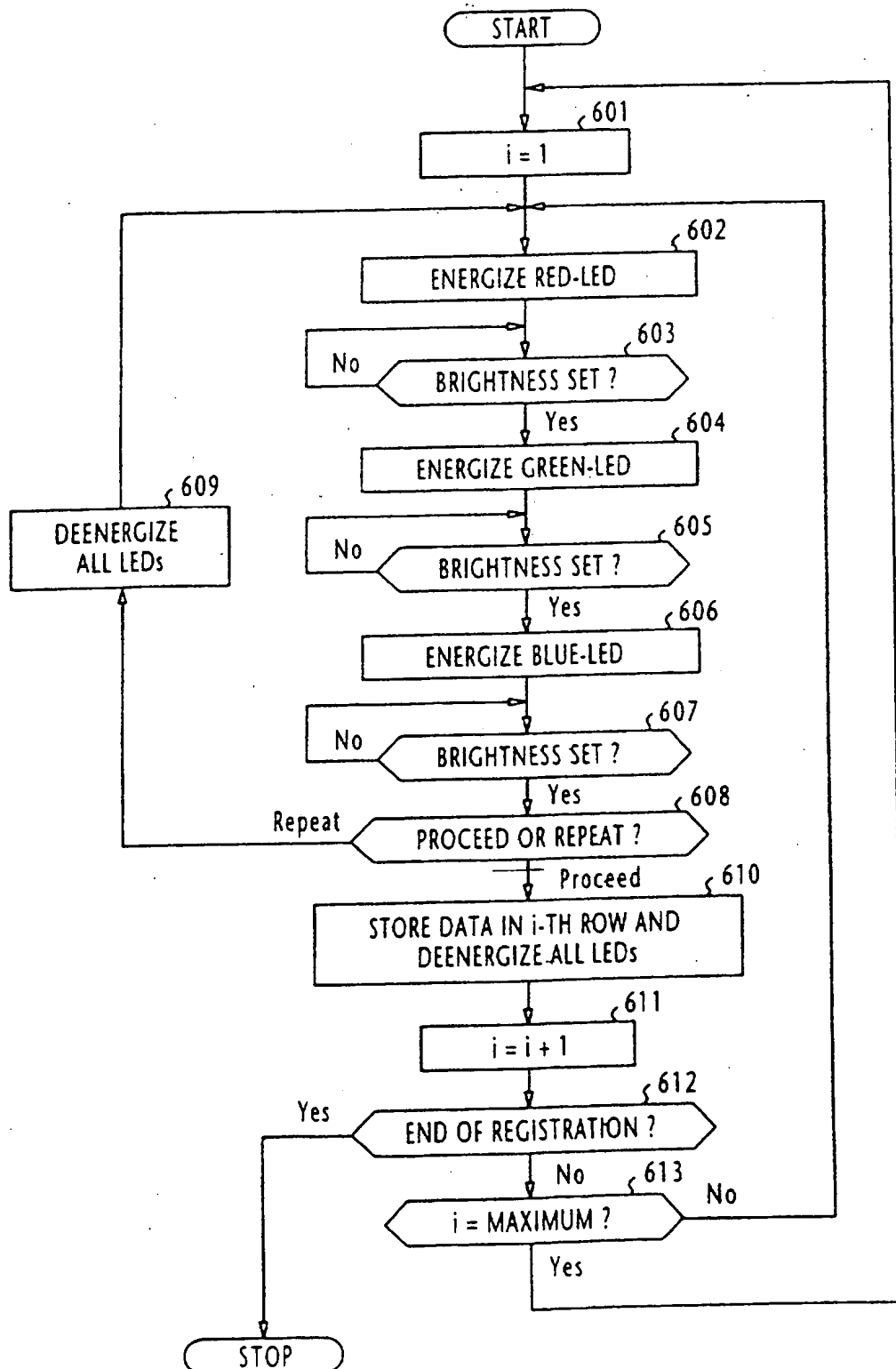
FIG. 6COLOR REGISTRATION MODE

FIG. 7
COLOR ASSIGNMENT MODE

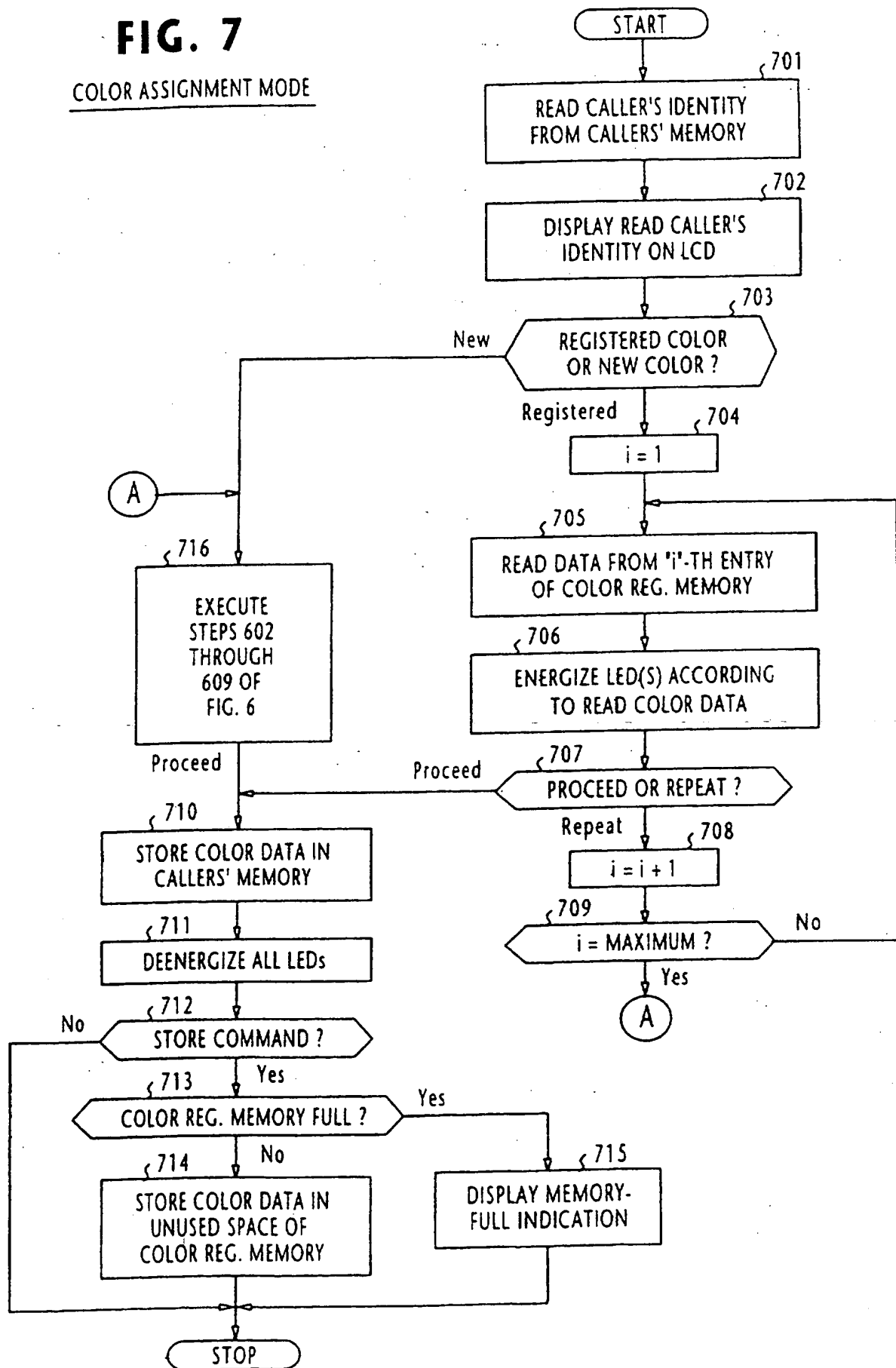


FIG. 8

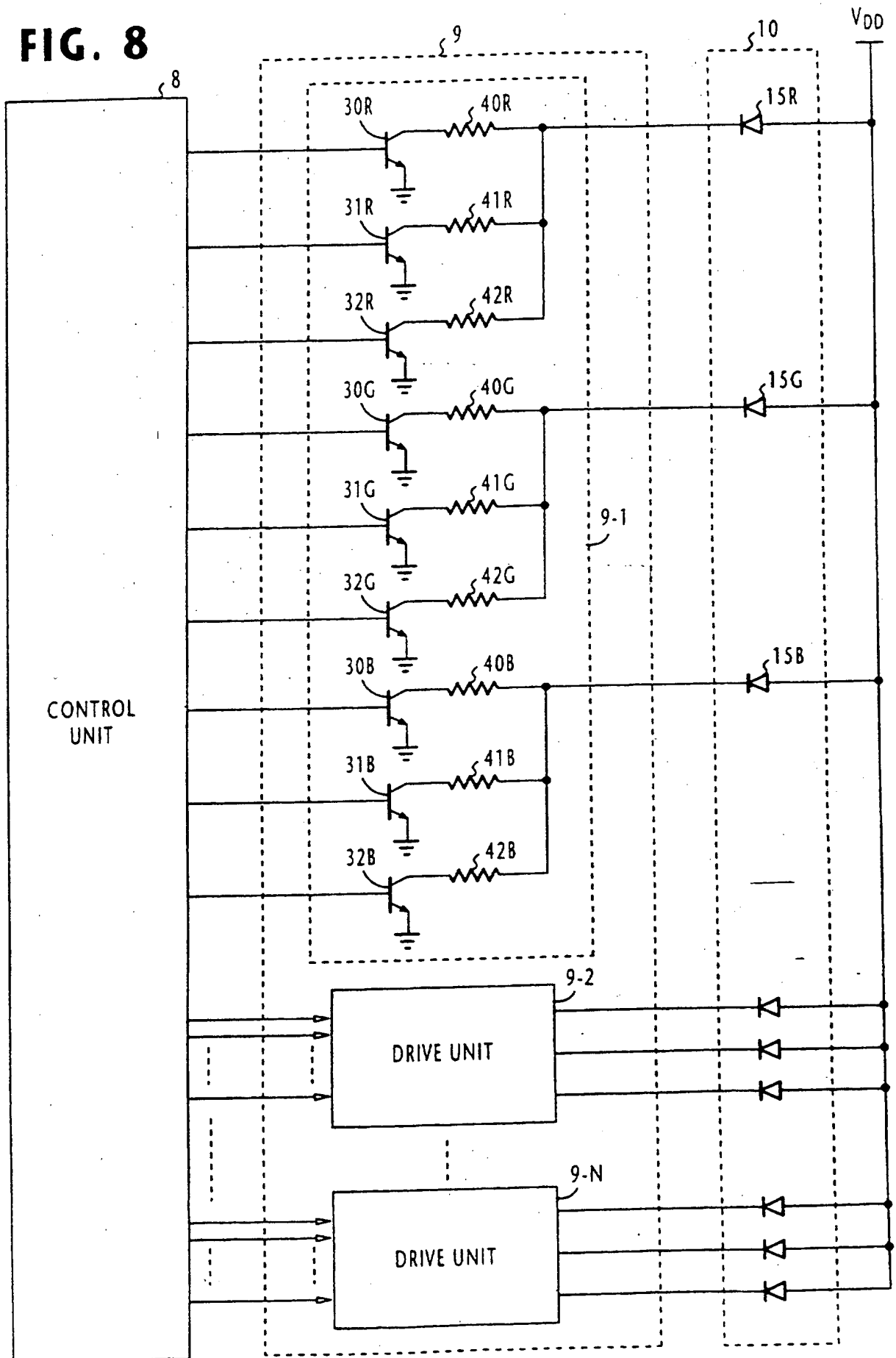
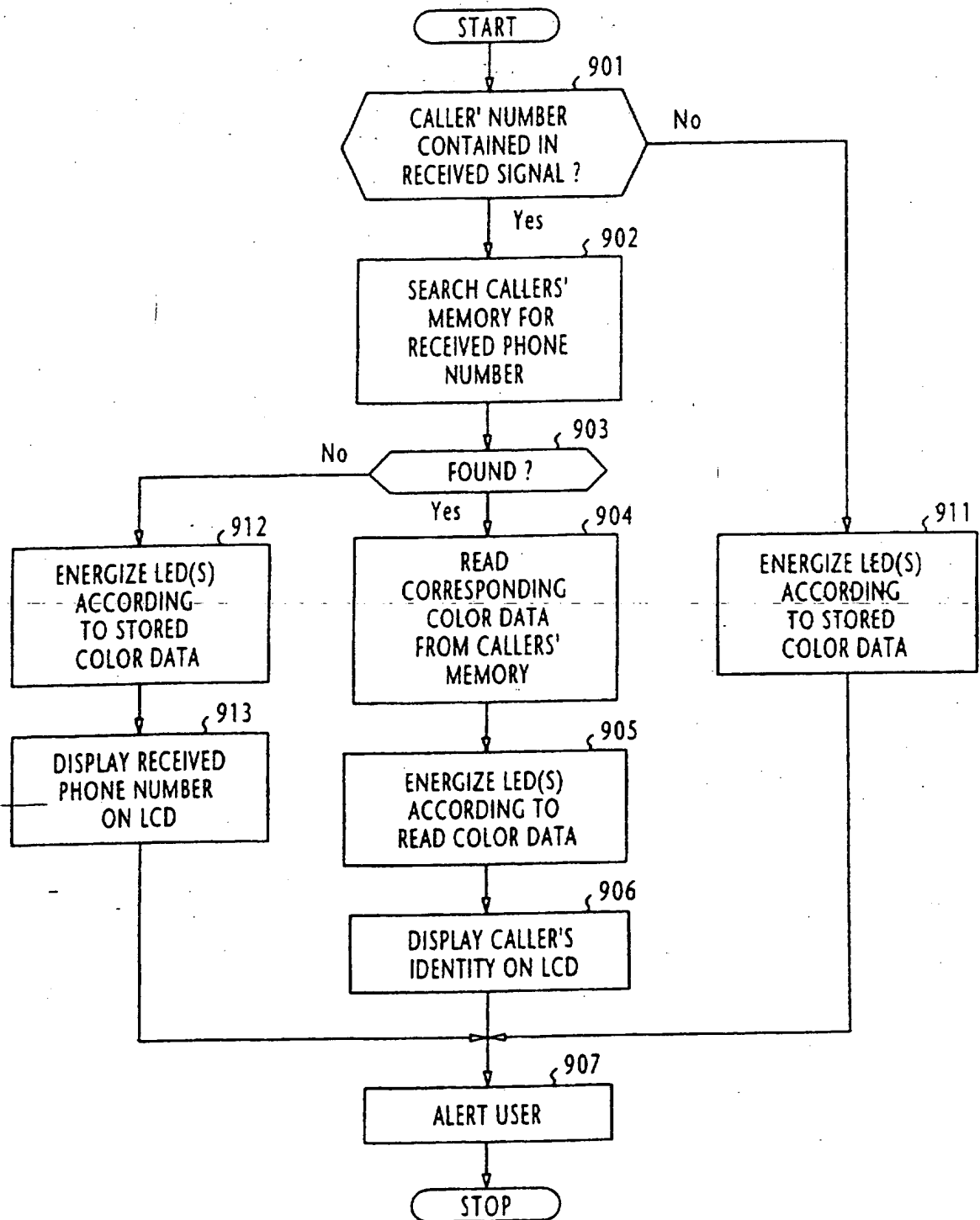


FIG. 9CALL RECEIVING MODE

1
2 "COMMUNICATION DEVICE AND METHOD FOR
3 PRODUCING A COLOR ILLUMINATION UNIQUELY
4 IDENTIFYING A CALLING SOURCE"
5 BACKGROUND OF THE INVENTION

6 Field of the Invention

7 The present invention relates generally to communication devices
8 and more specifically to a technique for identifying a received call.

9 Description of the Related Art

10 In conventional cellular mobile telephone systems, when a
11 mobile telephone is called, the telephone number of the calling party is
12 transmitted to the called unit and displayed on that unit to allow the
13 called user to identify the calling user before he answers the call.
14 Therefore, mobile users can determine whether a received call is from
15 known personnel or not.

16 However, because of the portability of mobile phones, their
17 display panel is too small to display called digits in sufficiently large
18 size to allow users to quickly recognize the received phone number. This
19 often causes users to answer calls dialed by a wrong number.

20 The mobile phone unit disclosed in Japanese Laid-Open Patent
21 Application 10-145475 pre-stores calling party's phone numbers in a
22 registration memory. When the user is alerted by receipt of a call, it
23 contains the phone number of the calling unit and the control unit
24 determines whether the phone number of the calling party's is stored in
25 the registration memory. The control unit turns on the liquid crystal

1 display (LCD) panel and illuminates it with a green background light
2 which is stored in a background color setting memory if the calling
3 party's phone number is stored in the registration memory. Otherwise,
4 the control unit illuminates the LCD panel with red background light.

5 Although the user can determine whether or not a received call is
6 registered, he still has to look closely into the display panel to read the
7 displayed phone number digits.

8 SUMMARY OF THE INVENTION

9 It is therefore an object of the preferred embodiments of the present
10 invention to provide a device and method of communication for providing
11 individual color background lighting for incoming calls for allowing users to
12 identify the originating source of a call without having the trouble of reading
13 displayed phone numbers.

14 According to a first aspect of the present invention, there is
15 provided a communication device comprising a memory for storing a
16 plurality of source identifying information for respectively identifying
17 calling sources and a plurality of color information corresponding to the
18 plurality of source identifying information, receiving circuitry for
19 receiving a call, detecting circuitry for detecting, in the memory, source
20 identifying information identifying the source of the received call, and a
21 lighting arrangement operable according to the color information stored
22 in the memory corresponding to the detected source identifying
23 information.

24 Since the lighting arrangement gives off light of a color that is
25 unique to a particular calling source only when the source identifying

1 information of the source is stored in the memory, the owner of the
2 communication device can readily identify the calling party.

3 According to a second aspect, the present invention provides a
4 communication device comprising a keypad, a lighting arrangement,
5 and a memory in which a plurality of source identifying information are
6 stored for identifying calling sources. Control circuitry is responsive to
7 color setting signals from the keypad for energizing the lighting
8 arrangement and storing, in the memory, a plurality of color information
9 corresponding to the plurality of source identifying information. When a
10 call is received, the control circuitry makes a search through the memory
11 for detecting source identifying information identifying the source of the
12 received call, and energizes the lighting arrangement according to the
13 color information stored in the memory corresponding to the detected
14 source identifying information.

15 According to a third aspect, the present invention provides a
16 communication device comprising a keypad, a lighting arrangement, a
17 first table for storing a plurality of source identifying information
18 identifying calling sources, and a second table. Control circuitry is
19 responsive to color setting signals from the keypad for energizing the
20 lighting arrangement and storing a plurality of color information in the
21 second table corresponding to the plurality of source identifying
22 information. In response to an assignment signal from the keypad, the
23 control circuitry selects color information from the second table and
24 energizes the lighting arrangement according to the selected color
25 information, and sets the selected color information in the first table

1 corresponding to one of the plurality of source identifying information.
2 In response to a call, the control circuitry makes a search through the
3 first table for detecting source identifying information identifying the
4 source of the received call, and energizes the lighting arrangement
5 according to the color information set in the first table corresponding to
6 the detected source identifying information.

7 According to a fourth aspect, the present invention provides a
8 communication method comprising the steps of storing, in a memory, a
9 plurality of source identifying information for respectively identifying
10 calling sources and a plurality of color information corresponding to said
11 plurality of source identifying information, receiving a call, making a
12 search through said memory for detecting source identifying information
13 identifying the source of the received call, and producing a color
14 illumination according to the color information stored in said memory
15 corresponding to the detected source identifying information.

16 According to a fifth aspect, the present invention provides a
17 communication method for a terminal device which includes a keypad,
18 a lighting arrangement, and a memory having a plurality of source
19 identifying information respectively identifying calling sources, the
20 method comprising the steps of energizing the lighting arrangement and
21 storing, in said memory, a plurality of color information according to
22 color setting signals from said keypad corresponding to said plurality of
23 color information, receiving a call, making a search through said
24 memory for detecting source identifying information identifying the
25 source of the received call, and energizing the lighting arrangement

1 according to the color information stored in said memory corresponding
2 to the detected source identifying information.

3 According to a sixth aspect, the present invention provides a
4 method for a communication device which includes a keypad, a
5 lighting arrangement, a first table in which a plurality of source
6 identifying information are stored for respectively identifying calling
7 sources, and a second table, the method comprising the steps of
8 energizing the lighting arrangement and storing a plurality of color
9 information in said first table according to color setting signals, selecting
10 color information from the second table in response to an assignment
11 signal from said keypad and energizing the lighting arrangement
12 according to the selected color information, and setting the selected color
13 information in the first table corresponding to one of said plurality of
14 source identifying information, receiving a call, making a search through
15 said first table for detecting source identifying information identifying
16 the source of the received call, and energizing the lighting arrangement
17 according to the color information set in said first table corresponding to
18 the detected source identifying information.

19 A further broad aspect of the invention is as set out in claim 1.

20 BRIEF DESCRIPTION OF THE DRAWINGS

21 Preferred features of the present invention will now be described, by
22 way of example only, with reference to the accompanying drawings, in which:-

23 Fig. 1 is a front view of a mobile phone unit embodying the present
24 invention;

25 Fig. 2 is a block diagram of the mobile unit of Fig. 1;

Fig. 3A is a plan view of a background lighting arrangement of a

1 liquid crystal display according to the present invention;

2 Fig. 3B is a cross-sectional view taken along the lines 3B and 3B of
3 Fig. 3A.

4 Fig. 4 shows an internal structure of a color registration memory;

5 Fig. 5 shows an internal structure of a callers' memory;

6 Fig. 6 is a flowchart illustrating the operation of a control unit
7 when blend color data is stored in the color registration memory;

8 Fig. 7 is a flowchart illustrating the operation of the control unit
9 when blend color data is individually assigned to callers' phone numbers
10 stored in the caller's memory;

11 Fig. 8 is a circuit diagram of the LED driver circuit; and

12 Fig. 9 is a flowchart illustrating the operation of the control unit
13 when a call is received.

14 DETAILED DESCRIPTION

15 In Figs. 1 and 2, there is shown a wireless communication device
16 of the present invention such as a cellular mobile unit 1. Mobile unit 1
17 has a liquid crystal display (LCD) panel 2 and a keypad 3 of a 3 x 6
18 matrix array which includes numeric keys, function keys and a off-hook
19 and on-hook keys, scroll keys. For speech communication, a
20 loudspeaker 5 and a microphone 6 are provided. A radio section 7
21 operates with an antenna 4 to establish a wireless link to a cell-site base
22 station.

23 A color registration memory 12 and a callers' memory 13 are
24 provided. The color registration memory 12 is used to map a plurality
25 of blend colors to corresponding sets of primary colors of different

1 brightness levels with which the LED array 10 is energized to illuminate
2 the LCD panel 2. The callers' memory 13 is used to map the color
3 settings of memory 12 to different calling parties identified by phone
4 numbers or names) and corresponding brightness levels with which the
5 LCD panel 2 is illuminated with light of blend colors specified by the
6 stored identifies of calling parties.

7 A control unit 8 provides initial setting of the color registration
8 memory 12 by allowing the user to register a plurality of desired blend
9 colors with which the LCD panel 2 will be illuminated by a
10 background lighting arrangement when a call is received. During color
11 assignment mode, the control unit 8 allows the user to store callers'
12 identities such as personal or public names in the caller's memory 13 and
13 maps corresponding blend colors to the caller's identities.

14 When a calling signal is received from the radio section 7, the
15 control unit examines the caller's memory 13 and displays on the LCD
16 panel 2 a caller's name if it is found in the memory 13 or a phone
17 number contained in the received signal if no corresponding name is
18 found and energizes a the LED array 10 through a driving circuit 9 to
19 illuminate the LCD panel 2 with light of a blend color specified for the
20 incoming call, and alerts the user with an alerting device 11.

21 The background lighting arrangement is shown in Figs. 3A and
22 3B. In this arrangement, the LED array 10 is secured on a circuit board
23 14 and consists of an array of groups of light emitting diodes 15A, 15G,
24 15B for emission of light of primary colors, i.e., red, green and blue. The
25 LED array 10 is overlaid with a translucent member 16 for uniformly

1 diffusing light rays from below to serve as background color lighting for
2 the LCD panel 2, which is secured in a frame 17 above the translucent
3 member 16. The LCD panel 2 is fixed in the frame 17 as shown in Fig.
4 3B above the translucent member 16.

5 Details of the table memories 13 and 14 are respectively shown in
6 Figs. 4 and 5.

7 In Fig. 4, the color registration memory 12 is partitioned into
8 rows and columns, with the column 21 defining index numbers for
9 identifying the rows, and the columns 22, 23 and 24 respectively defining
10 brightness levels of the primary colors of red, green and blue for the
11 respective light emitting diodes 15 of each group of the LED array. In
12 the illustrated example, brightness data red = 3, green = 0, and blue = 0
13 are stored in the row of index number $i = 1$, and red = 2, green = 0, and
14 blue = 2 are stored in the row of index number $i = 2$.

15 In Fig. 5, the caller's memory 13 has a plurality of entries in
16 which callers' phone numbers are mapped to respective sets of brightness
17 levels.

18 The color registration memory 12 and color assignment memory
19 13 are respectively set during color registration mode and color -
20 assignment mode according to input data manually entered through the
21 keypad 3 to the control unit 8 when the user determines desired blend
22 colors and when the user subsequently assigns the determined colors to
23 calling numbers.

24 The operation of the control unit 8 during the color registration
25 mode proceeds according to the flowchart of Fig. 6. Control unit 8 is set

1 in a color registration mode when the user operates a predetermined one
2 or a predetermined set of keys in the keypad 3.

3 A color registration routine starts with step 601 in which "1" is
4 set to a variable "i" that identifies the index number of memory 12, and
5 proceeds to step 602 to energize red-light emitting diodes and monitors
6 operated-key input from the keypad 3. The user is allowed to check and
7 control the red-color lighting level at one of four levels, i.e., the first
8 (lowest or turn-off), second, third and fourth (highest) brightness levels
9 respectively represented by "0", "1", "2" and "3". At decision step 603,
10 the control unit 8 checks to see if the brightness level of the red color
11 lighting is determined and set. With the red color setting being
12 completed, the red-emitting diodes are continuously energized at the set
13 level, and flow proceeds to step 604 to energize green-light emitting
14 diodes. The user now sees a blend of red and green colors and adjusts the
15 brightness of the green-color emitting diodes at one of the four levels.

16 When the brightness of green-color lighting is set (step 605), both
17 red- and green-light emitting diodes are continuously energized at the
18 respectively set values, and the control unit proceeds to step 606 to
19 energize blue-light emitting diodes and checks for a subsequent key
20 operation for the blue-color lighting. The user checks the blend of red,
21 green and blue colors and determines the blue-color lighting level and
22 hence the hue, tint and tone of the mixed three primary colors.

23 When the user is satisfied with the background lighting level of
24 the LCD panel, he operates a key that indicates that control unit 8
25 should proceed to the next routine. Otherwise, the user operates a key

1 that indicates control unit 8 should repeat the same routine. The
2 operation of such keys is checked at step 608. If the user is not satisfied
3 with the blend color light level, flow branches out from step 608 to step
4 609 to de-energize all light emitting diodes and returns to step 602 to
5 repeat the process. If the user is satisfied with the blend color setting,
6 control unit 8 proceeds from step 608 to step 610 to store data indicating
7 the three brightness levels in the i-th row of the color registration
8 memory 12 and de-energizes all light emitting diodes.

9 The variable "i" is then incremented by one at step 611. At step
10 612, the control unit 8 checks to see if an end-of-registration command is
11 entered from keypad 3. If so, flow proceeds to the end of the routine. If
12 the decision is negative at step 612, the control unit 8 checks to see if the
13 color registration memory 12 is full, at step 613. If the memory 12 is not
14 full, the variable "i" is not equal to a maximum number, flow returns to
15 step 602 to repeat the process. If the color registration memory 12 is full,
16 flow returns to step 601 to restart the operation of the routine.

17 The operation of the control unit 8 during the color assignment
18 mode proceeds according to the flowchart of Fig. 7.

19 A color assignment routine starts with step 701 to read a caller's
20 identity from the callers' memory 13. Control unit 8 supplies the read
21 identity to the LCD panel 2 (step 702) and the caller's identity is
22 displayed. The user is urged to enter an indication whether a blend
23 color registered in the memory 12 is to be assigned to the caller of the
24 displayed identity or a new blend color is to be assigned. If the user
25 indicates that a registered color is to be assigned, the user is urged to

1 select data from one of the entries of the color registration memory 12.
2 Control unit 8 proceeds from step 703 to step 704 to set the variable "i"
3 to 1 and read color data from the i-th entry of the color registration
4 memory 12 (step 705). At step 706, the LED array 10 is energized at
5 brightness levels specified by the retrieved blend color data. The LCD
6 panel 2 is thus background-illuminated in a specified blend color. The
7 user is thus allowed to check this color lighting and determine if it is
8 satisfactory or not for the calling number. He enters a command
9 indicating that the control unit 8 should repeat the process if the
10 background lighting is not acceptable. In response, the control unit 8
11 proceeds to step 708 to increment the variable "i" by one and returns to
12 step 705 if the variable "i" does not equals the maximum value (step
13 709).

14 If the user is satisfied with the background lighting, he enters a
15 command indicating that the control unit 8 should proceed (step 707).
16 In response to this command signal, the control unit 8 proceeds from step
17 707 to step 710 to store the color data in one entry of the caller's memory
18 13 corresponding to the calling identity which was retrieved from the
19 memory 13 at step 701. The LED array 10 is then de-energized (step
20 711). The routine proceeds to step 712 to check to see if a store
21 command is entered, indicating that the color data stored in the callers's
22 memory 13 is also stored in the color registration memory 12. If this is
23 the case, the routine proceeds to step 713 to determine if the color
24 registration memory 12 is full. If the color registration memory 12 is not
25 full, flow proceeds to step 714 to store the color data in an unused space

1 (entry) of the color registration memory 12, and the routine is
2 terminated. If the color registration memory 12 is full, the control unit 8
3 proceeds from step 713 to 715 to display a memory-full indication and
4 terminates the routine.

5 If the user has entered a repeat command at step 707 and the
6 variable "i" has reached the maximum value (step 709), or the user
7 initially desires a new color (step 703), the routine proceeds to subroutine
8 716 to execute steps 602 to 609 of Fig. 6 to produce a set of brightness
9 values for a new blend color and proceeds to step 710.

10 Drive circuit 9 is operated by the control unit 8 to energize the
11 LED array 10 in response to the color data stored in the color registration
12 memory 12 during the color registration mode and in response to the
13 color data stored in the callers' memory 13 during the color assignment
14 mode. Further, the drive circuit 9 is operated when the mobile unit
15 receives a call in a manner as will be described later.

16 As shown in Fig. 8, the drive circuit 9 includes a plurality of
17 drive units 9-1 to 9-N of identical configuration. Each drive unit is
18 comprised by three groups of transistor-resistor circuits connected
19 respectively to light emitting diodes 15 of different colors. Each
20 transistor-resistor circuit comprises a transistor 30 and a current limiting
21 resistor 40. Transistors 30 of each color group have their gates connected
22 to respective output ports of the control unit 8 and their emitters
23 connected to ground, with their collectors coupled through resistors 40 to
24 the corresponding light emitting diode 15. In each color group, the
25 resistor 40 has the greatest resistance value, the resistor 41 has a medium

1 value and the resistor 42 has the lowest value.

2 Therefore, when the transistors 30R, 31R and 32R are
3 individually turned on, the light emitting diode 15R gives off light of
4 different intensities corresponding to brightness of the fourth (bright),
5 third (medium) and second (dark) levels, respectively. When all of
6 these transistors are turned off, the brightness level of the light emitting
7 diode corresponds to the first level. As a result, there is a total of 64
8 combinations of brightness levels.

9 When a call is received from the network, the mobile unit
10 operates according to the flowchart of Fig. 9.

11 When the control unit 8 receives an alert signal from the radio
12 section 7, it checks to see if a caller's phone number is contained in the
13 received signal (step 901). If there is one, flow proceeds to step 902 to
14 search through the callers' memory 13 for the corresponding phone
15 number. If the received phone number is found in the callers' memory
16 13 (step 903), the control unit 8 proceeds to step 904 to read the
17 corresponding background lighting data from the callers' memory 13.
18 According to the read background lighting data, the LED array 10 is
19 energized to illuminate the LCD panel 2 (step 905) and the caller's
20 identity is displayed on the illuminated LCD panel 2. The user is then
21 alerted (step 907).

22 If no caller's phone number is contained in the received call, the
23 decision at step 901 is negative and flow proceeds to step 911 to energize
24 the LED array 10 according to stored data so that the LCD panel 2 is
25 illuminated by background light of a predetermined blend color. The

1 routine then proceeds to step 907 to alert the user.

2 If no phone number is stored in the callers' memory 13
3 corresponding to the received phone number, the decision at step 903 is
4 negative and control proceeds to step 912 to energize the LED array 10
5 according to stored data so that the LCD panel is illuminated with
6 background light of a predetermined blend color which may be
7 different from the color of step 911. The received phone number is then
8 put on display at step 913 and the user is alerted (step 907).

9 The operation of the control unit 8 will proceed as follows if the
10 mobile unit receives the following exemplary phone numbers (source
11 addresses).

12 If the received calling party's phone number is "0312345678", the
13 brightness values in the memory 13 are "3" for red, "0" for green and
14 blue. Therefore, the transistors 32R of all drive units are turned on and
15 all other transistors are turned off. Since the current-limiting resistor 42R
16 is of least resistance value of the red-color group, all red light emitting
17 diodes 15R are shone brightly, while all the other light emitting diodes
18 15G and 15B give off no light. As a result, the LCD panel 2 is brightly
19 illuminated with red background lighting.

20 If phone number "09087564321" is received, the brightness values
21 stored in the memory 13 are "1" for red, "0" for green and "2" for blue.
22 Therefore, the control unit 8 turns on transistors 30R, 31B of all drive
23 units and turns off all other transistors. Since the current-limiting resistor
24 40R is of highest value of the red color group and the resistor 41B is of
25 medium value of the blue color group, all red light emitting diodes 15R

1 of all are darkened and all blue light emitting diode 15B are shone at
2 medium brightness level and all green light emitting diodes 15B give off
3 no light. As a result, the LCD panel 2 is illuminated with a blended
4 color of dark red light and blue light of medium brightness.

5 In addition, when a calling party's phone number "0322224444"
6 is received, the brightness values stored in the memory 13 are "1" for red,
7 "3" for green and blue. Control unit 8 turns on transistors 30R, 32G and
8 32B of all drive units and turns off all other transistors. Since the
9 current-limiting resistor 40R is of highest value of the red color group
10 and the current-limiting resistors 42G and 42B are of least resistance
11 value of their color group, all red light emitting diodes 15R are
12 darkened and all blue and green light emitting diodes 15G and 15B are
13 shone brightly. As a result, the LCD panel 2 is illuminated with
14 background light of a blended color of dark red and bright blue and
15 green.

16 While mention has been made of an embodiment in which the
17 LCD panel 2 is illuminated with continuous light, the present invention
18 could be altered so that the illumination may be interrupted at intervals.
19 Such intervals may be changed according to different calling phone
20 numbers.

While the present invention has been described in its preferred
embodiments, it is to be understood that the words which have been used are
words of description rather than limitation, and changes may be made to the
invention without departing from its scope as defined by the appended claims.

Each feature disclosed in this specification (which term includes the claims) and/or shown in the drawings may be incorporated in the invention independently of other disclosed and/or illustrated features.

The text of the abstract filed herewith is repeated here as part of the specification.

In a communication device, source identifying information is stored in a memory for respectively identifying calling sources, and colour information corresponding to the source identifying information is also stored in the memory. When a call is received, the memory is searched for source identifying information identifying the source of the received call. If such identifying information is detected, a lighting arrangement is energized according to the colour information stored in the memory corresponding to detected source identifying information.

CLAIMS:

1. A communication device comprising:
means for identifying the source of a call;
means for comparing the identified source of the call with a plurality of stored calling sources each of which is associated with a respective stored identifier colour; and,
means for producing a colour illumination containing the stored identifier colour associated with the stored calling source corresponding to the identified source of the call.
2. A communication device comprising:
a memory for storing a plurality of source identifying information for respectively identifying calling sources and a plurality of color information corresponding to said plurality of source identifying information;
receiving circuitry for receiving a call;
detecting circuitry for detecting, in said memory, source identifying information identifying the source of the received call; and,
a lighting arrangement for producing a color illumination according to the color information stored in said memory corresponding to the detected source identifying information.
3. A communication device as claimed in claim 2, wherein said colour illumination is interrupted at intervals corresponding to the detected source identifying information.

4. A communication device comprising:

a keypad;

a lighting arrangement;

a memory; and,

control circuitry for energizing the lighting arrangement and storing, in said memory, a plurality of color information according to color setting signals from said keypad, and storing, in said memory, a plurality of source identifying information respectively identifying calling sources corresponding to said plurality of color information; and,

receiving circuitry for receiving a call;

said control circuitry being responsive to the call for making a search through said memory for detecting source identifying information identifying the source of the received call, and energizing the lighting arrangement according to the colour information stored in said memory corresponding to the detected source identifying information.

5. A communication device as claimed in claim 2 or 4, further comprising a display panel for displaying the detected source identifying information, wherein said lighting arrangement is configured to illuminate the display panel.

6. A communication device as claimed in claim 2 or 4, wherein said lighting arrangement comprises:

a plurality of groups of light emitting diodes, the light emitting diodes of each group producing light of primary colors; and,

driving circuitry for individually controlling said light emitting diodes

at different brightness according to color information stored in said memory.

7. A communication device comprising:

a keypad;

a lighting arrangement;

a first table for storing a plurality of source identifying information respectively identifying calling sources;

a second table;

control circuitry for (a) energizing the lighting arrangement and storing a plurality of color information in said second table according to color setting signals from said keypad, (b) selecting color information from the second table in response to an assignment signal from said keypad, (c) energizing the lighting arrangement according to the selected color information, and (d) setting the selected color information in the first table corresponding to one of said plurality of source identifying information; and,

receiving circuitry for receiving a call;

said control circuitry being responsive to the call for making a search through said first table for detecting source identifying information identifying the source of the received call, and energizing the lighting arrangement according to the color information set in said first table corresponding to the detected source identifying information.

8. A communication device as claimed in claim 7, further comprising a display panel for displaying the detected source identifying information, wherein said lighting arrangement is configured to illuminate the display panel as background lighting.

9. A communication device as claimed in claim 2, 4 or 7, wherein said source identifying information is a phone number.

10. A communication device as claimed in claim 7, wherein said lighting arrangement comprises:

a plurality of groups of light emitting diodes, the light emitting diodes of each group producing light of primary colors; and,

driving circuitry for individually controlling said light emitting diodes at different brightness according to color information of either of said first and second tables.

11. A communication device as claimed in claim 10, wherein said driving circuitry includes a plurality of transistors and a plurality of current-limiting resistors connected respectively to the plurality of transistors.

12. A communication device as claimed in claim 10, wherein said lighting arrangement further comprises a translucent member overlying said plurality of groups of light emitting diodes for illuminating said display panel as background lighting.

13. A communication device as claimed in claim 2, 4 or 7, wherein said receiving circuitry comprises means for receiving mobile communication signals.

14. A communication device as claimed in claim 2, 4 or 7, wherein said control circuitry is arranged to interrupt said energized lighting

arrangement at intervals corresponding to the detected source identifying information.

15. A communication method comprising the steps of:

- a) storing, in a memory, a plurality of source identifying information for respectively identifying calling sources and a plurality of color information corresponding to said plurality of source identifying information;
- b) receiving a call;
- c) making a search through said memory for detecting source identifying information identifying the source of the received call; and,
- d) producing a color illumination according to the color information stored in said memory corresponding to the detected source identifying information.

16. A communication method for a terminal device which includes a keypad, a lighting arrangement, and a memory having a plurality of source identifying information respectively identifying calling sources, the method comprising the steps of:

- a) energizing the lighting arrangement and storing, in said memory, a plurality of color information according to color setting signals from said keypad corresponding to said plurality of color information;
- b) receiving a call;
- c) making a search through said memory for detecting source identifying information identifying the source of the received call; and,
- d) energizing the lighting arrangement according to the color information stored in said memory corresponding to the detected source

identifying information.

17. A communication method as claimed in claim 15 or 16, further comprising producing a predetermined color illumination if said search fails to detect said source identifying information in said memory.

18. A communication method as claimed in claim 15 or 16, further comprising displaying the detected source identifying information, wherein said color illumination is produced as background lighting of the displayed source identifying information.

19. A communication method as claimed in claim 15 or 16, wherein the step (b) comprises receiving said call via a mobile communication channel.

20. A communication method for a communication device which includes a keypad, a lighting arrangement, a first table in which a plurality of source identifying information are stored for respectively identifying calling sources, and a second table, the method comprising the steps of:

a) energizing the lighting arrangement and storing a plurality of color information in said first table according to color setting signals;

b) selecting color information from the second table in response to an assignment signal from said keypad and energizing the lighting arrangement according to the selected color information, and setting the selected color information in the first table corresponding to one of said plurality of source identifying information;

- c) receiving a call;
- d) making a search through said first table for detecting source identifying information identifying the source of the received call; and,
- e) energizing the lighting arrangement according to the color information set in said first table corresponding to the detected source identifying information.

21. A communication method as claimed in claim 20, further comprising the step of energizing the lighting arrangement according to predetermined color information if said search fails to detect said source identifying information in said second table.

22. A communication method as claimed in claim 20, further comprising the step of displaying the detected source identifying information, wherein said color illumination is produced as background lighting of the displayed source identifying information.

23. A communication method as claimed in claim 20, wherein the step (c) comprises receiving said call via a mobile communication channel.

24. A communication device substantially as herein described with reference to and as shown in the accompanying drawings.

25. A communication method substantially as herein described with reference to and as shown in the accompanying drawings.



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Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): H4K (KFH)
H4L (LEUF)

Int Cl (Ed.7): H04M (1/56, 1/26, 1/27)

Other: On-Line - EPODOC, JAPIO, WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A,E	US 5 946 636 A (Ericsson) See abstract	-
X	US 4 726 059 A (Havel) See whole document, especially column 10 lines 36-44	1
A	JP 10 0023 137 A (Sony) See whole document and WPI abstract accession No.1998-152098	.

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.